

## TITANIA, ENSAYOS Y PROYECTOS INDUSTRIALES S.L.U

PT Tecnobahía, Edif. RETSE, Nave 4, Ctra. De Sanlúcar, Km 7  
11500 El Puerto de Santa María  
Spain

### FOR THE ATTENTION OF

Vanessa ARAGON Quality Responsible  
Ramon ARELLANO Technical Manager  
Pedro ASTOLA GONZALEZ Quality assurance manager  
Francisco CAAMANO Technical Manager  
Miguel Angel RODRIGUEZ CHACON Laboratory manager  
Fernando SERRANO Business Development Manager

CERTIFICATE PREPARED BY  
NUNEZ Cesar

YOUR QTML FOCAL POINT  
NUNEZ Cesar

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DATE  
17/02/2021  
OUR REFERENCE  
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276249

TYPE of External Shop  
Independent

### Attestation letter for Qualification on Test Methods

Dear Madam, Dear Sir,

We herewith inform that the couples <Test Methods / External Shop> as detailed in the Appendix have been either registered or modified in the Official Airbus Qualified Test Methods List (QTML).

The latest valid status of all qualified <Test Methods / External Shop> couples is published by regular QTML reports:

- On Airbus homepage for Suppliers (<https://www.airbus.com/be-an-airbus-supplier.html>) - Only Independent Labs.
- On Airbus Supply Portal A2QS - All External Shops.

A qualified couple is not linked to a specific product. It is the proof that the External Shop is meeting the requirement of the M20691.2: Perform Couple <Product/Supplier Site> Compliance and Maturity's Activities for Material Products Suppliers and/or M20691.3: Perform Couple <Product/Supplier Site> Compliance and Maturity's Activities for Aerostructure Parts Suppliers.

- On a quality aspect: we kindly ask you to indicate us any modification which could have a quality impact.
- Concerning technical requirements:
  - \* We kindly ask you to participate at least every 2 years to the PTP for the tests you perform on Airbus Products (see Appendix for details on next PTP participation requirements).  
You can find all necessary information about PTP participation process on the website: <https://ptpscheme.com>.  
In case of PTP results out of tolerances, the couples qualification can be downgraded to an authorisation to proceed or withdrawn and the PTP participation frequency is reduced to one year, subject to acceptance by Airbus of your Root Cause Analysis and associated Corrective Actions.
  - \* On the other hand, you shall supply at least every 2 years the results of your Internal Homogeneity Studies per Test Families.

Airbus reserves the right to withdraw or suspend the qualification at any time for specific reason, e.g.

- Any major incident(s) detected on one or several Test processes
- Lack in quality
- Evidence non-compliance with the M20691.2 and/or M20691.3
- Loss of Airbus Supplier Approval
- Stop of the Business

Yours faithfully,

**NUNEZ Cesar**  
**Airbus Test Methods Auditor POMDS – CE**  
**Your QTML Focal Point**



**SAUX Alexandra**  
**Test Methods Coordinator POMDS– CE**  
**Your Quality Responsible**



Appendix: Matrix of qualified Couples <Test Methods / External Shop>

## APPENDIX: Matrix of qualified Couples <Test Methods / External Shop>

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**Qualified or Authorised to proceed for the following Test processes:**

Test Standard(s) *	Test label	Complex.	Qualif. Status	Next PTP part. **	QCS Ref.	Remark
AIPS/AIPI 01-02-005	Preparation of holes in fibre reinforced plastic (FRP) and hybrid materials	Low	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 01-02-008	Torque tightening of screws, bolts and nuts	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 01-02-017	General assembly and installation of fasteners	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 01-02-022	Installation of parallel shank threaded fasteners	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 03-02-018	Manufacture of structural sandwich parts with thermosetting fibre reinforced skins	High	Qualified with limitations		171230	- Composite test specimen manufacturing and machining *Qualified on: 19/11/2018
AIPS/AIPI 03-02-019	Manufacture of monolithic parts with thermoset prepreg materials	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 03-07-002	Machining of fibre reinforced plastic (FRP) components	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 05-05-004	Wet installation of fasteners	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 06-01-003	Surface preparation for thermosetting parts before structural bonding	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 06-01-004	Mechanical surface preparation of non-structural adherend prior to adhesive bonding	Low	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 06-02-002	Non-structural adhesive bonding	Low	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AIPS/AIPI 06-02-006	Structural bonding of thermoset and thermoplastic matrices compocite parts	High	Qualified with limitations		171230	*Composite test specimen manufacturing and machining Qualified on 19/11/2018
AITM 1-0002	Fibre reinforced plastics - Determination of in-plane shear properties ( $\pm 45^\circ$ tensile test)	Low	Qualified	2021		
AITM 1-0003	Determination of the glass transition temperatures (DMA)	High	Qualified	2022	131066	
AITM 1-0005	Fibre reinforced plastics - Determination of interlaminar fracture toughness energy - Mode I - G1c	High	Qualified	2022	140131	

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AITM 1-0007-A / B / C / D	Fibre reinforced plastics - Determination of plain, open hole and filled hole tensile strength	Low	Qualified	2022		
AITM 1-0008-A1	Fiber reinforced plastics - Determination of plain compression strength (Thick specimens, <200kN)	High	Qualified	2022	181245	-Qualified on: 26/11/2018
AITM 1-0008-A2	Fiber reinforced plastics - Determination of plain compression strength (Thin specimens, <100 kN)	High	Qualified	2021	160660	Qualified on: 10/10/2018
AITM 1-0008-B / C / D	Fiber reinforced plastics - Determination of open hole or filled hole compression strength	Low	Qualified	2022		Qualified on 16/02/2021
AITM 1-0010	Fibre reinforced plastics - Determination of compression strength after impact	High	Qualified	2021	140496	
AITM 1-0019	Determination of tensile lap shear strength of composite joints	Low	Qualified	2021		Also according to I+D-E 352
AITM 1-0024	Determination of the completeness of cure of organic coatings	Low	Qualified			
AITM 1-0025	Fiber reinforced plastics - Flatwise tensile test of composite sandwich panel	Low	Authorised to Proceed April 2021	2021		
AITM 1-0030	Sealants - Determination of lap shear strength	Low	Qualified			
AITM 1-0032	Determination of non hardening characteristic of sealant	Low	Qualified			
AITM 1-0033	Sealants: Determination of the curing rate of sealing materials	Low	Qualified			
AITM 1-0036	Sealants - Determination of assembly time	Low	Qualified			
AITM 1-0053	Carbon fibre reinforced plastics - Determination of fracture toughness energy of bonded joints - Mode I - G1c	High	Qualified	2021	130240	Valid for the Issue 4 of the test standard
AITM 1-0066	Fibre reinforced plastics – Determination of pull-out / pull-through strength on riveted joints	Low	Qualified			
AITM 1-0070 (incl. ISO 4287)	Surface roughness measurements using surface stylus methods	Low	Qualified			
AITM 2-0013	Determination of sealant adhesion by linear debonding test	High	Qualified		130754	
AITM 2-0027	Determination of colour differences	Low	Qualified			Also according to UNE 48073

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Test Standard(s) *	Test label	Complex.	Qualif. Status	Next PTP part. **	QCS Ref.	Remark
AITM 2-0033	Sealants - Determination of slump	Low	Qualified			
AITM 2-0034	Sealants - Determination of tack-free time of sealing materials	Low	Qualified			
AITM 2-0061	Water pick up test-method to determine the impregnation level of prepreg materials	Low	Qualified			
AITM 3-0002	Analysis of non metallic material (uncured) by differential scanning calorimetry (DSC)	High	Qualified	2022	171331	
AITM 3-0003	Analysis of organic compounds by infrared spectroscopy (IR)	Low	Qualified			
AITM 3-0004	Determination of gel time and viscosity	Low	Qualified			
AITM 3-0008	Determination of the extent of cure by differential scanning calorimetry (DSC)	High	Qualified	2022	171331	
AITM 3-0025	Determination of solid content	Low	Qualified with limitations			Sealants
AITM 3-0030	Titration of sulphuric and tartaric acid in anodizing electrolytes	Low	Qualified			
AITM 3-0034	Combined determination of free hydroxide and aluminium in alkaline surface treatment baths	Low	Qualified with limitations			Qualified on 27/04/2020 *Limited to Free Hydroxide detection
AITM 3-0035	Determination of chloride contaminations in surface treatment baths	Low	Qualified			Qualified on 27/04/2020
AITM 3-0036	Determination of hydrogen ions in surface treatment baths	Low	Qualified			Qualified on 27/04/2020
AITM 3-0037	Determination of phosphoric and sulphuric acid in anodizing electrolytes	Low	Qualified			Qualified on 27/04/2020
AITM 3-0038	Determination of non-volatile-residue	Low	Qualified			Qualified on 27/04/2020
AITM 3-0038	Determination of non-volatile-residue	Low	Qualified			Qualified on 27/04/2020
AITM 4-0003	Test method for determining the pore content of fibre reinforced plastics using automatic image analysis	High	Qualified	2022	170170	
AITM 4-0005	Macroscopic and microscopic examination of fiber reinforced plastics	Low	Qualified			Risk assesment Ref X029ME1526459

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AITM 5-0009	Determination of resistance to bond line corrosion	High	Qualified		191111	
AITM 7-0003	Sealants - Determination of application time of sealing materials	Low	Qualified			
AMS 2315	Determination of delta ferrite content	Low	Qualified			Also according to LC-PE-063
ASTM B117	Standard practice for operating salt spray (Fog) apparatus	Low	Qualified	2022		
ASTM B557	Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products	Low	Qualified	2021		
ASTM B565	Shear testing of aluminum and aluminum-alloy rivets and cold-heading wire and rods	Low	Qualified			
ASTM D2240	Rubber property - Durometer hardness	Low	Qualified			
ASTM E112	Determining average grain size	Low	Qualified	2022		
ASTM E18	Standard Test Methods for Rockwell Hardness of Metallic Materials	Low	Qualified	2022		
ASTM E2602	Assignment of the glass transition temperature by modulated temperature differential scanning calorimetry (DSC)	High	Qualified			
ASTM E290	Bend testing of material for ductility	Low	Qualified			
ASTM E3	Standard guide for preparation of metallographic specimens	Low	Qualified			Also according to LC-PE-021
ASTM E340	Macroetching metals and alloys	Low	Qualified			
ASTM E384	Microindentation hardness of materials	Low	Authorised to Proceed June 2021	2021		
ASTM E407	Microetching metals and alloys	Low	Qualified			
ASTM E8	Tension testing of metallic materials	Low	Qualified	2021		
ASTM E92	Vickers Hardness and Knoop Hardness of Metallic Materials	Low	Qualified	2022		

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ASTM E975	Standard practice for x-ray determination of retained austenite in steel with near random crystallographic orientation	High	Qualified			Qualified on 09/07/2020
ASTM F1110	Sandwich corrosion test	Low	Qualified			
ASTM F483	Standard practice for total immersion corrosion test for aircraft maintenance chemicals	Low	Qualified			
ASTM G110	Evaluating intergranular corrosion resistance of heat treatable aluminium alloys by immersion in sodium chloride + hydrogen peroxide solution	Low	Qualified			Also according to LC-PE-022
ASTM G34	Exfoliation corrosion susceptibility in 2XXX and 7XXX series aluminum alloys (EXCO Test)	Low	Qualified			
EN 2002-1	Tensile testing at ambient temperature	Low	Qualified	2021		
EN 2002-6	Metallic materials: Bend testing	Low	Qualified			Also According to UNE-EN 910
EN 2243-1	Structural adhesives - Part 1: Single lap shear	Low	Qualified	2021		
EN 2243-2	Structural adhesives - Part 2: Peel metal-metal	Low	Qualified	2021		
EN 2243-3	Structural adhesives - Part 3: Peeling test metal-honeycomb core	Low	Qualified	2021		
EN 2557	Carbon fibre preimpregnates - Determination of mass per unit area	Low	Qualified			
EN 2558	Carbon fibre preimpregnates - Determination of the volatile content	Low	Qualified			
EN 2559	Carbon fibre preimpregnates - Test method for the determination of the resin and fibre content and the mass of fibre per unit area	Low	Qualified			
EN 2560	Carbon fibre preimpregnates - Determination of the resin flow	Low	Qualified			
EN 2561	Carbon Fibre reinforced plastics - Unidirectional laminates - Tensile test parallel to the fibre direction	Low	Qualified	2022		
EN 2563	Carbon fibre reinforced plastics - Unidirectional laminates - determination of apparent interlaminar shear strength	Low	Qualified	2022		

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EN 2564	Carbon fibre laminates - Determination of the fibre, resin and void contents	Low	Qualified	2022		Also according to ABT 1-0018
EN 2667-2 (Pren)	Foaming structural adhesives - Part 2: Compressive tube shear	Low	Qualified			
EN 2823 (prEN)	Fibre reinforced plastics - Determination of the effect of exposure to humid atmosphere on physical and mechanical characteristics	Low	Qualified			
EN 2850-B (PREN)	Carbon fibre thermosetting resin unidirectional laminates - Compression test parallel to fibre direction - Method B	Low	Authorised to Proceed June 2021	2021		
EN 3615	Fibre reinforced plastics - Determination of the conditions of exposure to humid atmosphere and of moisture absorption	Low	Qualified			
EN 3665	Paints and varnishes - Filiform corrosion resistance test on aluminium alloys	Low	Qualified			
EN 542	Adhesives - Determination of density	Low	Qualified			
EN 6042	Organic compounds - Test method - Analysis by infrared spectroscopy	Low	Qualified			
EN 6043	Determination of gel time and viscosity	Low	Qualified			
ISO 1183-1	Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method	Low	Qualified			
ISO 14129	Fibre-reinforced plastic composites - Determination of the in-plane shear stress/shear strain response, including the in-plane shear modulus and strength, by the ±45° tension test method	Low	Qualified	2021		
ISO 1463	Metallic and oxide coatings - Measurement of coating thickness - Microscopical method	Low	Qualified	2021		
ISO 1518	Paints and varnishes - Scratch test	Low	Qualified			
ISO 1519	Paints and varnishes - Bend test (cylindrical mandrel)	Low	Qualified			

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ISO 2106	Anodizing of aluminium and its alloys - Determination of mass per unit area (surface density) of anodic oxidation coatings - Gravimetric method	Low	Qualified			
ISO 2143	Anodizing of aluminium and its alloys - Estimation of loss of absorptive power of anodic oxidation coatings after sealing - Dye-spot test with prior acid treatment	Low	Qualified			
ISO 2360	Non-conductive coatings on non-magnetic electrically conductive basis materials - Measurement of coating thickness - Amplitude-sensitive eddy current method	Low	Qualified	2021		
ISO 2409	Paints and varnishes - Cross-cut test	Low	Qualified	2022		
ISO 2555	Plastics - Resins in the liquid state or as emulsions or dispersions - Determination of apparent viscosity by the Brookfield test method	Low	Qualified			
ISO 2781	Rubber, vulcanized or thermoplastic - Determination of density	Low	Qualified			
ISO 2808	Paints and varnishes - Determination of film thickness	Low	Qualified	2021		
ISO 2811-1	Paints and varnishes - Determination of density - Part 1: Pyknometer method	Low	Qualified			
ISO 2812-2	Paints and varnishes - Determination of resistance to liquids - Part 2: Water immersion method	Low	Qualified	2022		
ISO 2813	Paints and varnishes - Determination of specular gloss of non-metallic paint films at 20°, 60° and 85°	Low	Qualified			
ISO 3251	Paints, varnishes and plastics - Determination of non-volatile-matter content	Low	Qualified			
ISO 4624	Paints and varnishes - Pull-off test for adhesion	Low	Qualified			
ISO 48-4	Rubber, vulcanized or thermoplastic — Determination of hardness — Part 4: Indentation hardness by durometer method (Shore hardness)	Low	Qualified			Qualified on 27/04/2020
ISO 6507	Metallic materials - Vickers hardness test	Low	Authorised to Proceed June 2021	2021		

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ISO 6508	Metallic materials - Rockwell hardness test	Low	Qualified	2022		
ISO 7724-3	Paints and varnishes - Colorimetry - Part 3: Determination of colour differences	Low	Qualified			
ISO 868	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	Low	Qualified			
ISO 9227	Corrosion tests in artificial atmospheres - Salt spray tests	Low	Qualified	2022		
NASM 1312-1	Fastener test methods - Method 1: Salt Spray	Low	Qualified			
NASM 1312-13	Fastener test methods - Method 13: Double shear test	Low	Authorised to Proceed March 2021	2021		Also according to UNE EN 7246 and LC-PE-010
NASM 1312-20	Fastener test methods - Method 20: Single shear	Low	Qualified			
NASM 1312-31	Fastener test methods - Method 31: Torque	Low	Qualified			Also according to LC-PE-008
NASM 1312-6	Fastener test methods - Method 6: Hardness	Low	Qualified			
Z_Comp. spec. machining	Composite specimen machining / cutting / tabbing	None	Qualified			
Z_Corrosion	Corrosion	None	Qualified			According to AMS2700, ASTM A380, ASTM A967 and ISO 8075
Z_Metal. Spec. prep	Metallic specimen preparation (for mechanical testing)	None	Qualified with limitations			Only according to LC-PE-021
Z_Opt. metallo.	Optical metallography	None	Qualified			Steel, Ti, Al

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Test Standard(s) *	Test label	Complex.	Qualif. Status	Next PTP part. **	QCS Ref.	Remark
Z_Spectro. OES	Spectrometry: optical emission (OES)	None	Qualified	2022	Al Base:	<ul style="list-style-type: none"> <li>- Si (0.011 - 14.33) % Low ± 0.002 % High ± 0.29 %</li> <li>- Fe (0.011 - 1.30) % Low ± 0.002 % High ± 0.05 %</li> <li>- Cu (0.007 - 8.50) % Low ± 0.002 % High ± 0.17 %</li> <li>- Mn (0.005 - 6.93) % Low ± 0.002 % High ± 0.14 %</li> <li>- Mg (0.004 - 3.97) % Low ± 0.002 % High ± 0.16 %</li> <li>- Cr (0.001 - 0.32) % Low ± 0.001 % High ± 0.02 %</li> <li>- Ti (0.002 - 0.25) % Low ± 0.001 % High ± 0.02 %</li> <li>- Pb (0.001 - 0.17) % Low ± 0.001 % High ± 0.01 %</li> <li>- Zn (0.006 - 7.45) % Low ± 0.002 % High ± 0.15 %</li> <li>- Ni (0.001 - 2.47) % Low ± 0.001 % High ± 0.10 %</li> <li>- Zr (0.001 - 0.29) % Low ± 0.001 % High ± 0.02 %</li> </ul>
					Fe Base :	<ul style="list-style-type: none"> <li>- Si (0.010 - 4.03) % Low ± 0.003 % High ± 0.16 %</li> <li>- Mn (0.017 - 8.16) % Low ± 0.003 % High ± 0.16 %</li> <li>- S (0.001 - 0.35) % Low ± 0.001 % High ± 0.02 %</li> <li>- P (0.003 - 0.47) % Low ± 0.002 % High ± 0.03 %</li> <li>- Cr (0.002 - 26.72) % Low ± 0.001 % High ± 0.53 %</li> <li>- Mo (0.001 - 4.99) % Low ± 0.001 % High ± 0.20 %</li> <li>- Ni (0.002 - 25.05) % Low ± 0.001 % High ± 0.50 %</li> <li>- Ti (0.001 - 2.01) % Low ± 0.001 % High ± 0.08 %</li> <li>- Nb (0.002 - 0.58) % Low ± 0.001 % High ± 0.02 %</li> <li>- V (0.009 - 0.80) % Low ± 0.003 % High ± 0.03 %</li> <li>- Cu (0.001 - 6.28) % Low ± 0.001 % High ± 0.13 %</li> <li>- Al (0.001 - 1.08) % Low ± 0.001 % High ± 0.04 %</li> </ul>
					Ti Base :	<ul style="list-style-type: none"> <li>- Al F3 (0.002 - 7.79) % Low ±</li> </ul>

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## APPENDIX: Matrix of qualified Couples <Test Methods / External Shop>

We hereby declare the External Shop:

**TITANIA, ENSAYOS Y PROYECTOS INDUSTRIALES**  
**S.L.U**

PT Tecnobahía, Edif. RETSE, Nave 4, Ctra. De Sanlúcar, Km 7  
 11500 El Puerto de Santa María  
 Spain

CERTIFICATE PREPARED BY  
 NUNEZ Cesar

DATE  
 17/02/2021

OUR REFERENCE  
 SUR2020.0063 Ind. E

ARP-ID of the External Shop  
 276249

TYPE of External Shop  
 Independent

Qualified or Authorised to proceed for the following Test processes:

Test Standard(s) *	Test label	Complex.	Qualif. Status	Next PTP part. **	QCS Ref.	Remark
						0.001 % High ± 0.16 % - V (0.020 - 5.55) % Low ± 0.004 % High ± 0.11 %

\* Unless otherwise specified, last issue of the standard shall apply.

\*\* Next PTP participation year is given for information - It is the External Shop's responsibility to check every year on the PTP Website (<https://ptpscheme.com/>) which kits are proposed.